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BRAYA IN BOREAL EASTERN AMERICA¹

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(Plates 1088–1090)

The genus *Braya* is based on a species of the Carinthian Alps, *B. alpina* Sternberg and Hoppe.² A number of species have since been recognized in various parts of the world, the first summary treatment for North America being that by Hooker.³ No recent treatment of the genus in boreal eastern America has been attempted. Therefore the writer has undertaken this as best he could without the benefit of the European types. It is expected that a careful checking of the type of at least *Braya glabella* may lead to modifications of nomenclature.

Individuals within the species of *Braya* are able to survive and reproduce under the most adverse circumstances. There follows upon this a familiar but nevertheless confusing intraspecific morphological variability, not only in the vegetative structures but

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² Denkschr. Bot. Ges. Regensburg 1: 65–75. 1815.

³ W. J. Hooker, *Flora Boreali-Americana*, vol. 1, 65–66. 1840.

even in the siliques. Within a single collection of a foliose species, such as *B. linearis* Rouy of Scandinavia and Greenland, one will find well-developed individuals with leafy stems, as well as individuals which are so reduced as to be scapose; nevertheless all are flowering and fruiting. Depauperate individuals may be identifiable if in the fruiting stage, but if they are in flower they present the greatest difficulty. Leaf-characters in reduced individuals are also misleading since the leaves may be practically linear and entire, whereas under more favorable circumstances leaves in the same species will be characteristically oblanceolate and with several evident teeth on each margin. It is obvious then, that depauperate plants wholly in flower will be difficult or impossible to place satisfactorily unless they are associated with fruiting plants from the same clone. A detailed description of variability within a single limited population as observed at Richmond Gulf is given below under *B. purpurascens*.

KEY TO BRAYA IN BOREAL EASTERN AMERICA

(Note: the statements below apply only to well-developed plants)

1. *Stems foliose*⁴, the stem-leaves sometimes with axillary tufts of leaves; *basal leaves and bracts not infrequently with several teeth*
 2. *Sepals caducous; fruiting branches arising from axis of the year; usually more than 10 seeds on one side of the dissepiment; mature siliques (from middle of the inflorescence) usually 15 mm. or more long and 0.7–1.0 mm. wide; fruiting inflorescence loose; plants with several stems which may be arcuate-ascending*.....1. *B. humilis*
 2. *Sepals persistent; fruiting branches never arising from axis of the year; usually fewer than 10 seeds on one side of the dissepiment; mature siliques (from middle of the inflorescence) usually less than 15 mm. long and 1–1.4 mm. wide; fruiting inflorescence tending to be congested above; stems erect*.....2. *B. linearis*
1. *Stems scapose*, the scapes occasionally with foliose bracts but then with a flower or fruit in the axil of each; siliques usually more than 1.4 mm. wide, but if narrower then less than 6 mm. long; *the basal leaves and bracts (if present) usually entire, rarely with one or two teeth*
 3. Siliques ovate-elliptic to elliptic-oblong, torulose when elongate, seeds in two rows.....3. *B. purpurascens*
 3. Siliques lance-subulate, not torulose, the few seeds crowded into one row
 4. Petals 4–5 mm. long and 1.5–2 mm. wide, the siliques glabrous; limb of the petal bright white, claw blue-violet.....4. *B. Longii*
 4. Petals 3–4 mm. long and 1–1.4 mm. wide, the siliques hirtellous; petals uniformly lilac to pink, fading to white.....5. *B. Fernaldii*

⁴ Depauperate individuals may be scapose, but can sometimes be recognized as belonging to this group by their narrow siliques (1.4 mm. or less).

1. BRAYA HUMILIS (C. A. Meyer) B. L. Robinson in Gray, Synopt. Flora N. A., 1, pt. 1, 141 (1895). *Sisymbrium humile* C. A. Meyer in Ledeb. Ic. pl. ross. 2: 16 (1830). *Torularia humilis* (C. A. Meyer) O. E. Schulz in Limpricht, Fedde Rep. Beih. 12: 390 (1922).

A notable series of isolated occurrences characterize *B. humilis*, especially in eastern North America. There is an East Greenland population (Plate 1089, fig. 1) quite separate from a much-restricted West Greenland occurrence (Plate 1088, fig. 3). No specimens from the mainland of the Labrador peninsula (which is, of course, known primarily from coastal exploration) have come to the writer's attention. In the Gulf of St. Lawrence it appears again on Anticosti Island (Plate 1088, fig. 4), and in one area (Table Mt.) in Newfoundland (Plate 1088, fig. 5). The southernmost occurrence is on Willoughby Mountain in Vermont (Plate 1088, fig. 1). Moving westward, there are stations on the west and south of James Bay and on the near-by southern shore of Hudson Bay (Plate 1088, fig. 2). There is a major gap between these eastern occurrences and the stations in or near the Rocky Mountains. To the north there are scattered records from Fort Simpson and northward, and in Alaska. To what extent the major areas in the west are natural can be determined only after more thorough collecting has been done. However there has been sufficient collecting on the coasts of Greenland, and of the Labrador peninsula, about the Gulf of St. Lawrence and throughout New England to make it reasonably certain that the populations there are notably restricted.

In studying the variation within this species a number of characters were checked on some 130 sheets of specimens. These characters were habit, margins of basal leaves, pubescence of the silique, nature of the stigma, and the dimensions of the style, of the body of the silique, of the pedicel and of the petals and sepals. It is evident from the key which follows and from the descriptions for each of the geographic races that there is overlapping of all characters to such an extent that it would be unjustifiable to propose them as varieties or perhaps even as forms. They are treated therefore as numbered races, even though their distribution is disjunct.

The following key summarizes the average set of characters about which each of these geographic races varies.

THE GEOGRAPHICAL RACES OF *B. HUMILIS* IN EASTERN NORTH AMERICA

1. Styles of mature fruits short (0.2–0.7, aver. 0.3–0.4, mm. long); stigma in fruit not capitate; siliques glabrescent to moderately pubescent, the silique from 0.9–1.2 (aver. 1.0) mm. wide. Race 1 (East Greenland)
1. Styles of mature fruits long (0.3–1.2, aver. 0.7–1.0 mm.)
2. Pedicels of lowermost fruits 2.0–9.0 mm. long
3. Siliques moderately pubescent to glabrescent, stigmas moderately capitate or not capitate
4. Pedicels 3–6 (aver. 4.3) mm. long, siliques 0.6–0.7 mm. thick. Race 6 (southern Hudson Bay)
4. Pedicels 2–4 (aver. 2.7) mm. long, siliques 0.7–1.0 mm. thick. Race 3 (Anticosti Island)
3. Siliques glabrescent, stigmas markedly to moderately capitate
5. Siliques 0.7–0.8 (aver. 0.7) mm. thick; habit moderately erect (rarely strict); petals (dry) 3.2–4.2 (aver. 3.6) mm. long; basal leaves mostly deeply toothed. Race 5 (New England)
5. Siliques 0.8–1.0 (aver. 0.9) mm. thick; habit strict (rarely moderately erect); petals (dry) 2.6–3.6 (aver. 3.2) mm. long. Race 2 (West Greenland)
2. Pedicels of lowermost fruits 1–2 (aver. 1.6) mm. long, stigmas not capitate, plants markedly dwarfed. Race 4 (Newfoundland)

RACE 1. Plants moderately erect. Fruit relatively thick, 9–16.5 mm. long, 0.9–1.2 mm. wide, glabrescent to moderately pubescent; style short (0.2–0.5 mm.), not capitate; pedicel of lowermost fruit 2–5 mm. long. Petals (dry) 3–4.2 mm. long, 1.2–2.0 mm. wide. Sepals (dry) 2.0–3.4 mm. long, 1.0–1.4 mm. wide. East Greenland. PLATE 1089, FIG. 1.—EAST GREENLAND: dry “Fjaeldmark”, northwest coast of Clavering Island, 74° 25' N, 24/7, 1929, *G. Seidenfaden* 84 (B); south side of Jordan hill, 74° 07' N, 27/7, 1930, *Seidenfaden* 799A (B); dry “Fjaeldmark”, Stronberg Penin., Geolog Fjord, 73° 48' N, 18/8, 1929, *Seidenfaden* 364 (B); head of Franz Joseph Fjord, 73° 10' N, 27. VIII. 1929, *Seidenfaden* 523b (O); “Fjaeldmark”, Suess Land, Kempe Fjord, 72° 53' N, 20/8, 1929, *Seidenfaden* 462 (B).

RACE 2. Plants strict, or sometimes moderately erect. Fruit moderately thick (12–17 mm. long, 0.8–1.0 mm. wide), glabrescent; style fairly long (0.6–1.0 mm.), markedly capitate; pedicel of lowermost fruit 3–5 mm. long. Petals (dry) 2.6–3.6 mm. long, 1.0–1.6 mm. wide. Sepals (dry) 2.0–2.6 mm. long, 0.9–1.4 mm. wide. West Greenland. PLATE 1088, FIG. 3.—WEST GREENLAND: Itivdleq-Fjord, Qingua, 66° 29' N., Jul. 6, 1926, *M. P. Porsild*, s. n. (G, N, O); same locality, 4.8. 1914, *M. P. & A. E. Porsild*, s. n. (G, N, O, M).

RACE 3. Plants moderately erect or sometimes strict, tall. Fruit long (13–23 mm. long, 0.7–1.0 mm. wide), moderately pubescent; style variable in length (0.4–1.2 mm.), stigma moderately capitate to not capitate; pedicel of lowermost fruit short

(2–4 mm.). Petals (dry) 3.2–4.0 mm. long, 1.2–1.8 mm. wide. Sepals (dry) 2.0–2.9 mm. long, 1.0–1.4 mm. wide. Anticosti Island. PLATE 1088, FIG. 4.—QUEBEC: gravelly bed of Jupiter River, Anticosti, Aug. 18, 1883, *Macoun* 12 (G); along rivers and on gravel, Jupiter River, Anticosti, Aug. 18, 1883, *Macoun* (335.113) 2086 (O); Anticosti, P. Q., Aug. 23, 1883, *Macoun* s. n. (N); platnières de l'embouchure, Rivière Jupiter, Anticosti, Aug. 11, 1926, *Marie-Victorin & Rolland-Germain* 24,849 (G, N, P, O); sur les platnières, Rivière du Brick, Anticosti, Jul. 23, 1927, *Marie-Victorin & Rolland-Germain* 27203 (G, N, P, O).

RACE 4. Plants moderately erect, or sometimes strict, very short. Fruit very short (12–14.5 mm. long, 0.8–0.9 mm. wide), moderately pubescent; style fairly long (0.6–1.0 mm.) and not capitate; pedicel of lowermost fruit very short (1.0–2.0 mm. long). Petals (dry) 3.0–4.0 mm. long, 0.8–1.5 mm. wide. Sepals (dry) 1.8–2.4 mm. long, 0.8–1.2 mm. wide. Newfoundland. PLATE 1088, FIG. 5.—NEWFOUNDLAND: dry exposed ledges and shingle on the limestone tableland, altitude 200–300 m., Table Mountain, region of Port à Port Bay, July 16 & 17, 1914, *M. L. Fernald & H. St. John* 10837 (G, N, B, C).

RACE 5. Plants moderately erect or sometimes strict. Fruit long and narrow (14–20 mm. long, 0.7–0.8 mm. wide), glabrescent; style long (0.7–1.2 mm.), stigma moderately capitate; pedicel of lowermost fruit long (3–7 mm.). Petals (dry) 3.2–4.2 mm. long, 1.0–1.6 mm. wide. Sepals (dry) 2–2.8 mm. long, 0.8–1.4 mm. wide. Vermont. PLATE 1088, FIG. 1.—*B. humilis* var. *leiocarpa* (Trautv.) Fernald, *Rhodora* **39**: 276 (1937).—VERMONT: gravelly shelves of cliffs, Bald Mt., Westmore, Aug. 8, 1929, *A. S. Pease* 21055 (G); Willoughby Mt., 1866, *H. Mann*, s. n. (G); Willoughby Mt., no date, *H. Mann*, s. n. (C); Willoughby Mt., Jul. 19, 1880, *C. G. Pringle*, s. n. (G, N, B); moist alpine cliffs, Willoughby Mt., Westmore, VII—2—1894, *A. J. Grout & W. W. Eggleston*, s. n. (G, N, B, P, C).

RACE 6. Plants moderately erect to strict. Fruit long and narrow (15.5–18.0 mm. long, 0.6–0.7 mm. wide), moderately pubescent; style long (0.7–1.2 mm.), moderately capitate to not capitate; pedicel of lowermost fruit 3–6.0 mm. long. Petals (dry) 3.0–5.0 mm. long, 1.0–2.4 mm. wide. Sepals (dry) 2.2–3.4 mm. long, 0.8–1.4 mm. wide. Southern Hudson Bay and James Bay. PLATE 1088, FIG. 2.—ONTARIO: sandy river banks, Moose Factory, Jul. 3, 1929, *A. E. Porsild* 4636 (O); clearing, N. E. end of Moose Island, Moose River, Jul. 3, 1929, *D. Potter* 541 (G); Moose Island, 2½ mi. E. of Moosonee, Moose River, 7/9/35, *M. T. Doult* 2239 (D); river bank, opposite Allen Island, Abitibi River, June 30, 1929, *D. Potter* 542 (G); 60 miles up Kapiscow R., w. coast of James Bay, July 1902, *W. J. Wilson* 54009 (O); mouth of Equam R., James Bay, July 9, 1901, *D. B. Dowling*

34,555 (O); gravelly banks, Severn River, Keewatin, July 29, 1886, *J. M. Macoun* (G s. n., O no. 2087).

2. *B. LINEARIS* Rouy, *Illustr. Pl. Eur. Rar.* **9**, p. 84; *Rev. Bot. Syst. Geog. Bot.* **1**, p. 76 (1903).—*B. alpina* of authors, not Sternberg and Hoppe. *B. glabella* of authors, probably not Richardson. *B. purpurascens* of authors, not (R. Brown) Bunge.⁵—EAST GREENLAND: dry soil, south side of Jordan hill, 74° 07' N., 27/7, 1930, *G. Seidenfaden* 799-B (B); "Fjaeldmark", on the south coast of Andree Land, 73° 18' N., 19. VIII. 1929, *Seidenfaden* 434b (O, B); sandy slopes, head of Fr. Joseph Fjord, 73° 11' N, 27/8, 1929, *Seidenfaden* 523 (B); Ella Island, Cape Oswald, 72° 53' N, *Thorv. Sørensen*, 3577a (O). WEST GREENLAND: Ingnerit Fjord, Magdlâq, 12–13 Jul., 1929, 71° 7' N, *M. P. & R. T. Porsild*, s. n. (N, G); Ingnerit Fjord, Tasiussaq, 71° 3' N, 13 Jul. 1929, *M. P. & R. T. Porsild*, s. n. (G).

Nordhagen has drawn attention to Schulz's conclusion⁶ that the Greenland material which has often passed as *B. glabella*, is *B. linearis*. Nordhagen's discussion⁷, being in Norwegian, is not readily accessible and is worthy of presentation in translation.

"Another controversial species is *Braya linearis* Rouy. The Scandinavian plant was originally called *B. alpina* Sternb. & Hoppe; but, as shown by several investigators, the middle European plant of this name is distinctly different from the Scandinavian. Rouy described the latter as *B. linearis*, nova species. In the meantime Gelert in 1898 had already asserted that the Scandinavian species was identical with an Arctic-American species, *B. glabella* Richards., of which there are specimens in British herbaria. In 1921 C. Alm introduced this name in Scandinavian literature.

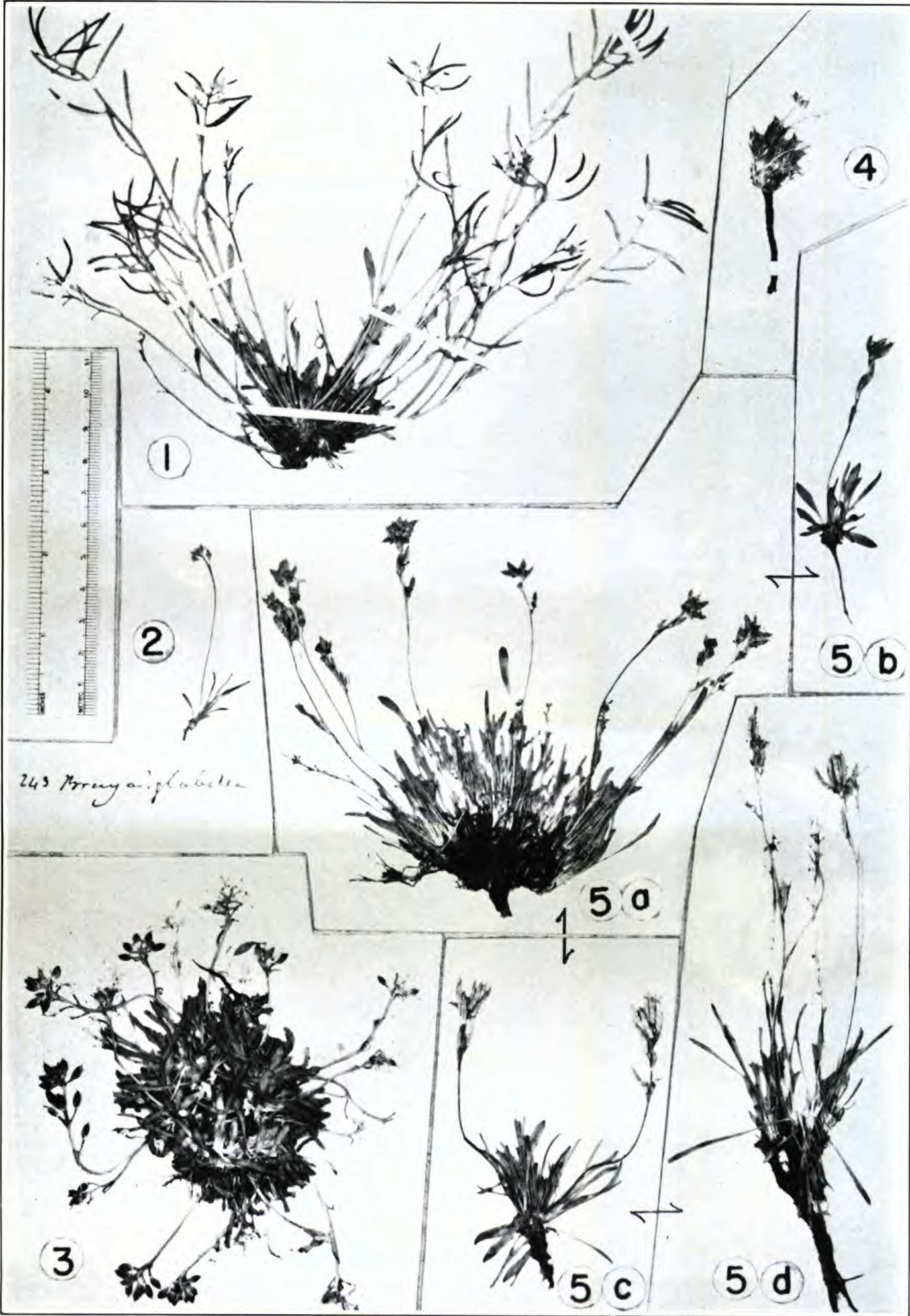
But in 1924 the German investigator Schulz, who has treated *Braya* for "Das Pflanzenreich", maintained that he could show that the name *B. linearis* must be retained because the Scandinavian species is clearly different from *B. glabella* Richards.; the latter, according to Schulz, is more robust and has much wider fruits. According to Schulz typical *B. linearis* occurs in addition to Norway only in Sweden and east Greenland.

In east Greenland the problem is complicated by the fact that the plant occurs with *B. humilis* (C. A. Mey.) Robins. According to younger Danish botanists (cf. the works of Seidenfaden, Sørensen and Gelting), who operate with the name *B. glabella* Richards., it forms a mixed popula-

⁵ Oblast. Jakutsk: ad flumen Lena, Kumach-Sur, 31/7, 1898, *H. Nilsson-Ehle* s. n. (G, B), from Siberia, determined in the N. Y. Bot. Gard. material as *Braya alpina* Sternb. et Hoppe and as *B. linearis* Rouy in the Gray Herb. This material clearly is closely related to *B. linearis*, but occasionally has tufts of leaves in the axils of the lower leaves. This Siberian relative of *B. linearis* needs further study which may throw some light on Alaskan species.

⁶ O. E. Schulz, *Das Pflanzenreich*, IV. 105, Cruciferae-Sisymbrieae, p. 230 (1924).

⁷ R. Nordhagen, *Om Arenaria humifusa* Wg. og dens betydning for utforskningen av Skandinavias eldste floraelement. Bergens Mus. Årbok **1935**, Naturvidsk. rekke Nr. 1, pp. 52, 53 (1935).



BRAYA HUMILIS, $\times \frac{2}{5}$, FIG. 1
B. GLABELLA, $\times \frac{2}{5}$, FIG. 2
B. purpurascens, $\times \frac{2}{5}$, FIGS. 3-5d

tion together with *B. humilis*, certainly of hybrid origin ("*Braya glabella-humilis*"). . . .

Another noteworthy report by Sørensen (p. 39) is that *Braya purpurascens* hybridizes with the complex "*Braya glabella-humilis*". Hybrids are reported in this case to be sterile or weakly fruitful. In Gelting (1934, p. 57) one finds the following remarkable passage: ". . . judging from the Greenland material, *B. glabella* should be considered a variety of that species (*Braya purpurascens*)."

In Norway in the meantime *B. purpurascens* and *B. linearis* are completely different. I place myself sceptically against the assertion that *B. purpurascens*, *B. glabella* (= *B. linearis* with Schulz) and *Torularia* [*Braya*] *humilis* form a single series of forms in Greenland without distinct limits. It occurs to me that the chapter *Braya-Torularia* in Greenland is very obscure.

All that can be said with certainty is the following:

1. In Norway two distinct species of *Braya* occur, namely *B. purpurascens* (Magerøya) and *B. linearis* Rouy, which also occurs in northern Sweden (see fig. 22).
2. Neither of these is identical with *B. alpina* of the east Alps.
3. The probabilities are that "*B. glabella* Richards." is not identical with the Scandinavian species *B. linearis* Rouy.
4. According to Schulz, *B. linearis* also occurs in East Greenland. In the meantime this question cannot be answered until the entire Greenland *Braya-Torularia* material is subjected to a critical and satisfying investigation.

In the following I designate the Scandinavian bicentric *Braya* as *B. linearis* Rouy, and since this according to Schulz also occurs in East Greenland, we are obviously faced with a west-arctic amphi-Atlantic species.

Nordhagen's viewpoint concerning *B. linearis* is not generally accepted⁸ but is, in the opinion of the writer, the most tenable until the identity of *B. glabella* is clearly established through a careful study of the type.

B. glabella Richardson, Bot. App., Franklin's Narr. Jour. Arctic Sea, ed. 1, p. 743 (1823); *ibid.*, ed. 2, p. 753 (1823); W. J. Hooker, Flor. Bor. Am. 1: 65 (1830). *B. alpina* of Scandinavian and other authors, not Sternberg and Hoppe. *B. linearis* of Scandinavian and other authors, not Rouy.—243 *Braya* ? *glabella* [in Richardson's hand] Richardson's Arctic Plants [in an unidentified hand] (G). PLATE 1089, FIG. 2. The type locality is given by Richardson (loc. cit.) as "On the Copper Mountains".

This is the only authentic specimen which the writer has seen. It is probably an isotype since the number corresponds to the numbering of the species in ed. 1 of Franklin's Narrative and the number and name are written in Richardson's hand.

⁸ cf., for example, T. W. Böcher, Biological distributional types in the flora of Greenland. Medd. Grøn. 106; No. 2, p. 101 (1938).

The specimen is a rather starved, flowering individual, having five flowers which terminate a rather slender bractless scape. The nearly glabrous, basal leaves are linear, one of them with a single tooth half-way to the apex. The scape is puberulent with appressed, bifurcate hairs and occasional short, simple hairs. The sepals of the flowers are oblong-ovate, ca. 2.2 x 1.0 mm., glabrous or with an occasional simple hair, green with a translucent margin. The petals (dried) are creamy-white and tinged with purple at the base, the narrow obtuse limb tapering gradually into the claw, the dimensions ca. 1 x 3 mm. The plant is not in fruit. The ovary in the older flowers is elliptic-oblong, its surface very sparsely supplied with appressed bifurcate hairs. The style is distinct and from 0.5–0.7 mm. long, and barely capitate at this stage of development. Richardson had sufficient material before him to supply the following information concerning fruiting material “ . . . racemo fructifero elongato”, and “siliquae immaturae suberectae calyce persistente triplo longiores, toruiosae [sic], stylo coronatae”.

W. J. Hooker, with the opportunity to study Richardson's material from both the first and second Franklin Expeditions, characterizes (loc. cit.) *B. glabella* as follows “foliis glabris [although Richardson (loc. cit.) says “glabriuscula”], scapo plerumque folioso, racemis fructiferis laxis elongatis”. Hooker goes on to comment “Excellent specimens of this, brought home by Dr. Richardson from the Second Arctic Land Expedition, quite confirm the distinguishing characters given by that gentleman in his Botanical Appendix. He adds, in the margin of his own copy, from notes taken on the spot, that the ‘scape is sometimes hairy, with bifurcated pubescence, and that the flowers are white, with a slight and partial tinge of purple’.” Furthermore Hooker without hesitation keeps *B. glabella* in the genus *Braya* which he describes in part (loc. cit.) as having “Siliqua brevis, teres, torulosa stylo terminata, valvis subsemicylindraceis.”

Undoubtedly this species, as the first described *Braya* from the North American continent, is greatly in need of clarification. Its description in the first edition of Franklin's *Journal* obviously antedates R. Brown's *Chloris Melvilliana* of the same year (1823) because Brown refers to Richardson's published record of the same year. In the opinion of the writer *B. glabella* falls in the

B. purpurascens complex more nearly than it does in the *B. linearis* group. Furthermore no material seen by the writer from the western Arctic resembles *B. linearis*, so that it seems unlikely that *B. glabella* will fall into that category. Also Richardson characterizes it in his original description (loc. cit.) as having "Racemis elongatis . . .", a character which certainly does not by any stretch of the imagination fit the inflorescence of *B. linearis* which is condensed even in fruit.

There is no evidence against *Braya glabella* of Richardson being conspecific with *B. purpurascens* (R. Brown) Bunge. The chief difficulty is the lack of positive evidence concerning the nature of the mature siliques and of their arrangement on the scape. Should these support the possibility that the two are conspecific, then the name *B. glabella* would have to be substituted for *B. purpurascens*.

3. *B. PURPURASCENS* (R. Brown) Bunge in Ledeb. Flor. Ross. 1: 195 (1841). *Platypetalum purpurascens* R. Br., Chloris Melvill. [192] & [254] (1823); App. XI in Parry's Voy. p. cclxvii & cccviii (1824). *B. glabella* of authors, perhaps of Richardson. *B. Thorild-Wulffii* Ostenfeld in Medd. Grønl. 54: 176 (1923). *B. purpurascens* var. *dubia* Schulz, Pflzrch. IV. 105: pp. 235, 364 (1924); perhaps not *Platypetalum dubium* R. Br.—EAST GREENLAND: Lille Suends, ca. 76° 45' N., 24 Jun. 1908, A. Lundager 1062 (O, det. as *Braya Thorild-Wulffii* Ostf. by Ostenfeld in 1924); same locality, 22 June 1908, Lundager 1056 (N, det. as *B. Thorild-Wulffii* Ostf. by Ostenfeld, Sept. '24); dry "Fjaeldmark", south coast of Hochstetter Foreland, 75° 08' N, 24/6, 1930, R. Bøgvad 1080 (B); sand, northwest coast of Clavering Island, 74° 25' N, 24/7, 1929, G. Seidenfaden 82 (B, N); dry "Fjaeldmark", Gästis Valley, Musk-ox Fjord, 73° 34' N, 14/8, 1930, Seidenfaden 1009 (N, B); sandy soil, Cape Elizabeth, Ella Island, 72° 54' N, 17/8, 1930, Seidenfaden 1030 (B, O).—WEST GREENLAND: clayey, gravelly soil in shallow depression in rock, back of the Station, region of North Star Bay, 76° 30' N, June 21, 1914, W. E. Ekblaw 407 (G, N); common, from patch just east, back of trading station, region of North Star Bay, 76° 30' N, July 18, 1914, Ekblaw 408 (G); Ingnerit Fjord, Magdlâq, 71° 7' N, 12–13 Jul. 1929, M. P. & R. T. Porsild s. n. (N, G, O); Qâersuarssuk, 70° 44' N, 26/7. 1927, M. P. Porsild s. n. (N, O); Nûgssuaq Halvø, Kugssinerssuaq, 70° 18' N, 4 Jul. 1929, M. P. & R. T. Porsild s. n. (N, G, O). ELLESMERE ISLAND: Grant Land, 82° 27' N, July 1906, L. J. Wolf s. n. (B); muddy flat, Bache Peninsula, 79° 4' N, 76° 18' W, July 31, 1927, M. O. Malte 118 896 (O); in locis

argillaceis, ad Barren Vallies, sinus Harbour Fjord, 76° 37' N, 84° 25' W, 28. vii. 1900, *H. G. Simmons* 2388 (G, B); muddy flat, Craig Harbor, 76° 12' N, 81° 20' W, *M. O. Malte* 118 933 (O). NORTH DEVON ISLAND: muddy flat, Dundas Harbour, 74° 33' N, 82° 12' W, Aug. 3, 1927, *M. O. Malte* 118930 (O, G); same locality, July 27–28, 1927, *M. O. Malte* 118884 (O); Dundas Harbour, Sept. 7, 1936, *N. Polunin* 779 (O); same data, *Polunin* 2510 (G); same data, *Polunin* 2515 (O). BAFFIN ISLAND: Lake Harbour, 62° 94' N, 69° 55' W, Aug. 2, 1928, *M. O. Malte* 120294 (O, G); same locality, Aug. 30–31, 1934, *N. Polunin* 1121 (O); same locality, Aug. 27, 1936, *Polunin* 2327 (G); same locality, July 23, 1939, *M. E. Oldenburg* 124 (M); Arctic Bay, Sept. 8–11, 1936, *Polunin* 2524 (O). SOUTHAMPTON ISLAND: Southampton, 64° 15' N, 82° 50' W, Aug. 15, 1928, *M. O. Malte* 120677 (G, O); H. B. Co. Post, South Bay, Aug. 22, 1936, *Polunin* 2275 in part (G). COATS ISLAND: wet clay amongst limestone gravel, 62° 49' N, 81° 50' W, Sept. 19, 1930, *A. E. Porsild* 5904 (O). NOTTINGHAM ISLAND (Hudson Strait): crevices of rocks, Aug. 26, 1884, *R. Bell* s. n. (N, G, and, O as 471.192.2176). LABRADOR PENINSULA: Rama, Jul. 15–Aug. 20, 1894, *A. Stecker* 60 (B, N, G); dunes of coarse sand above beach, Joksut Inlet, Clark Harbor, 62° 12' N, 64° 23' W, July 20 & 21, 1937, *V. C. Wynne-Edwards* 7172 (O); Wakeham Bay, 61° 40' N, 72° 5' W, July 30, 1928, *M. O. Malte* 120191 (G, O); moist limestone ledges, south side of Gulf Hazard, Richmond Gulf, 56° 10' N, 76° 45' W, Aug. 12, 1939, *E. C. & L. B. Abbe* 3819 (M).

In working over the material cited above, the writer at first attempted to segregate as "typical" those specimens which most closely accorded with Robert Brown's descriptions and Hooker's figures. Robert Brown originally described *Platypetalum purpurascens* on the basis of material brought back from the first Parry Expedition (loc. cit. p. 192) and extended his concept of this species when the Ross material collected on the second Parry Expedition became available while he was completing the "Chloris Melvilliana" (loc. cit., p. 254). The original description refers to the siliques as "ovales" and "glabriusculae," while the extension of his concept describes them as "v. ovali-oblongae, glabrae v. pilis raris brevibus simplicibus bifidisque conspersae". W. J. Hooker's familiar figures (loc. cit., vol. 2, tab. xxiii) illustrate both phases very well. Much of the material collected in the lower Arctic is readily referred to this typical state of the species (for instance Ekblaw's no. 408, North Star Bay, Greenland; cf. Plate 1089, fig. 3), as has been pointed out by Polunin⁹,

⁹ N. Polunin, Botany of the Canadian Eastern Arctic Pt. 1, Pteridophyta and Spermatophyta. Nat. Mus. Canada, Bull. no. 92. 1940. p. 249.

but gradually gives way to a depauperate state to the north or in more exposed areas. In its extreme form this depauperate phase has been described by Osentfeld as *B. Thorild-Wulffii* and is considered by Seidenfaden and Sørensen¹⁰, who have studied it in the field, as "a particularly well-founded species." The writer, however, sees no support for this view, considering the extreme plasticity of this species and of its relatives. Thus it was found unrealistic to segregate the most depauperate phase of this species from the "typical" material.

At the other extreme is the very robust series of plants from Southampton Island (Plate 1090, fig. 1) with elongate, oblong siliques, to which Polunin has referred (loc. cit.). These are indeed strikingly unlike the great majority of specimens, but even judging by the limited number of plants which are to be found on any one sheet, they are occasionally associated with less extreme individuals. That this is indeed the case is illustrated by a suite of some 58 plants collected at an isolated station of limited extent at Richmond Gulf, P. Q., by Mrs. Abbe and the writer (no. 3819). There is complete intergradation of the characters studied¹¹ in this population from a lower limit which falls well within the "typical" material originally described by R. Brown and illustrated by Hooker (represented in our illustrations by fig. 3, Pl. 1089) into the robust type of specimen from Southampton Island to which Polunin has already called attention. Some of the variations in the Richmond Gulf population are illus-

¹⁰ G. Seidenfaden and T. Sørensen. The Vascular Plants of Northeast Greenland from 74° 30' to 79° 00' N. Lat. Medd. Grønl. 101; 36 (1937).

¹¹ It may not be amiss to give a description of this population because of its rather peculiar interest. Scapes range from 2.5 to 15 cm. in length and from slender to coarse; they are pubescent with either curly simple hairs or with bifurcate appressed hairs, or a mixture of the two. The form of rosette leaves ranges from strictly linear to narrowly oblanceolate or narrowly long-spatulate. Rarely a leaf may have a single tooth on the margin. The leaves may or may not be furnished with widely spaced simple hairs on the margins, and may or may not have tufts of simple hairs at their apices. The siliques may be crowded closely together on the fruiting scapes, or the lowermost siliques may be separated from the rest, or the siliques may be scattered generally along the length of the scape. The lowermost flower or silique may be in the axil of a foliose bract or not. The long-persistent sepals are oblong-obovate, ca. 2.5 x 1.2 mm., green or purple-green, with or without simple pubescence near the apex. Petals (dry) are creamy-white to tinged with purple, the obtuse to subretuse limb tapering gradually into the claw. Petals vary in length from 3 to 4 mm. and in width from 1 to 1.5 mm. The siliques vary in shape from rather short-elliptic (ca. 1.5 x 5 mm.) to long oblong-elliptic (ca. 2 x 12 mm.), tending to be somewhat torulose. The valves of the siliques are rather densely pubescent, being covered with either crisp simple hairs, or appressed bifurcate hairs. The style is distinct (from 0.3 to 1.0 mm. long), usually with an evident depressed capitate stigma.

trated in Plate 1089: Fig. 5a represents the phase with narrow leaves and oval silique; fig. 5b, the plant with the broader rosette leaf but the oval silique; fig. 5c, the broader leaf and elongate, oblong silique; and finally fig. 5d, the narrow-leaved plant with the long oblong silique.

In view of the variation which occurs within the Richmond Gulf population with reference to often-used characteristics, such as pubescence, it has not been thought advisable to recognize any of the variants which Schulz¹² and others have accepted. These include var. *dubia* (R. Br.) Schulz which is based on length of the style, f. *leiocarpa* Schulz and a densely pilose form erroneously referred to f. *pilosa* (Hook.) Schulz¹³, based on pubescence. An inadvertent transfer, f. *longisiliquosa* (Trautv.) Schulz, in synonym.¹⁴, which Trautvetter characterized in part as "siliquis latitudine sua fere quadruplo longioribus . . .", and which has been adopted by some writers, cannot be accepted in the light of the dimensions of the Richmond Gulf material.

In conclusion, then, the writer recognizes no valid dividing lines in the material of *B. purpurascens* which he has seen and therefore can only propose that the name be used in the broad sense without qualification.

4. *B. LONGII* Fernald, RHODORA 28: 202 (1926). NEWFOUNDLAND, STRAITS OF BELLE ISLE: turfey or peaty pockets in limestone ledges, Sandy (or Poverty) Cove, Aug. 1, 1924, M. L. Fernald, B. Long & B. H. Dunbar 26,723 (G); among loose rocks, limestone barrens, Sandy (or Poverty) Cove, Jul. 12, 1925, Fernald & L. Griscom 28,423 (G, C); dry, gravelly limestone barrens, Savage Point, Jul. 13, 1925, Fernald, K. M. Wiegand, et al. 28,425 (G, B, O, C); gravelly and peaty limestone barrens, Sandy (or Poverty) Cove, Jul. 25, 1925, Fernald, Long & F. A. Gilbert, Jr. 28,424 (G, TYPE, B, C); crevices of dry limestone barrens, Yankee Point, Aug. 16, 1925, Fernald, Wiegand & Long 28,427 (G, C); dry gravelly and turfey limestone barrens, Savage Point, Fernald & Long 28,426 (G, C, B, O).

5. *B. Fernaldii*, sp. nov. Foliis rosulatis lineari-oblongatis 10–25 mm. longis, 0.5–2 mm. latis; racemo fructifero subcapitato-

¹² O. E. Schulz. Pflanzenreich IV. 105 (1924), pp. 234 & 235.

¹³ A reduction by Schulz of Hooker's *Braya pilosa* but, judging from authentic material in the Gray Herbarium, at the National Museum of Canada, and at the N. Y. Botanical Garden, *B. pilosa* Hooker is wholly distinct from *B. purpurascens* so that Schulz's transfer must be considered as a lamentable error.

¹⁴ This is simply given as "f. *longisiliquosa* Trautv." by Schulz, but it was described by Trautvetter as a variety.

elongato; pedicellis 1.5–3.0 mm. longis; petalis 3–4.2 mm. longis, 1–1.6 mm. latis, spathulato-oblongatis, roseis; antheris 0.4–0.5 mm. longis; siliculis lanceolato-subulatis 5–7 mm. longis, 1.4–1.6 mm. latis, stylo 0.4–0.6 mm. longis, seminibus subbiseriatis vel uniseriatis; seminibus 1.2 mm. longis, 0.6 mm. latis.—NEWFOUNDLAND. TYPE in Herb. Gray (*Wiegand, Griscom & Hotchkiss* 28,434). PLATE 1090, FIG. 2.—*B. americana* (Hook.) Fern., as applied by Fernald, RHODORA 28: 203 (1926), exclusive of the plant of Alberta, not *B. alpina*, β . *americana* Hook., Flor. Bor.-Am. 1: 65 (1830).—NEWFOUNDLAND: gravelly limestone barrens one mile back of Savage Cove, Straits of Belle Isle, Jul. 24, 1925, *M. L. Fernald & B. Long* 28428 (G, C, O, B); open spots in limestone barrens near Ice Point, St. Barbe Bay, Jul. 14, 1925, *K. M. Wiegand, F. A. Gilbert, Jr. & N. Hotchkiss* 28429 (G, C); moist gravel of limestone barrens on the Highlands northeast of Big Brook, Straits of Belle Isle, Jul. 15, 1925, *A. S. Pease & L. Griscom* 28430 (G); gravelly and peaty limestone barrens back of Big Brook, Straits of Belle Isle, Jul. 15, 1925, *Fernald & Long* 28431 (G, C); clayey spots in dry limestone barrens, northern half of Burnt Cape, Pistolet Bay, Jul. 17, 1925, *Fernald, Wiegand, et al.* 28432 (G, C); boggy depressions in limestone barrens, Cape Norman, Pistolet Bay, Jul. 18, 1925, *Wiegand, Griscom & Hotchkiss* 28434 (G, TYPE, C); dry rocky and gravelly limestone barrens, Cape Norman, Pistolet Bay, Jul. 18, 1925, *Wiegand, Griscom & Hotchkiss* 28433 (G, C); sandy and clayey spots in limestone gravel barrens, Boat Harbor, Str. of Belle Isle, Jul. 19, 1925, *Fernald, Wiegand & Long* 28435 (G, C); swale near mouth of brook, Watts Bight, Straits of Belle Isle, Jul. 19, 1925, *Pease, Griscom, et al.* 28436 (G, C); gravelly limestone barrens, Four-Mile Cove, Straits of Belle Isle, Jul. 20, 1925, *Fernald, Wiegand & Long* 28437 (G); damp clay pockets in limestone rock-barrens one mile back of Savage Cove, Straits of Belle Isle, Jul. 23, 1925, *Fernald, Pease & Long* 28438 (G); dry gravel of limestone barrens, southern half of Burnt Cape, Pistolet Bay, Aug. 5, 1925, *Fernald & Long* 28439 (G); dry gravel of limestone barrens, Cape Norman, Pistolet Bay, Aug. 13, 1925, *Wiegand & Long* 28440 (G, C).

In 1926 Professor Fernald described *B. Longii* (vid. sup.) naming it for his good friend and long-time field-companion, Bayard Long. He also reported a similar but distinct species which he considered to be identical with Hooker's *B. alpina*, β . *americana*. This name he raised to specific rank so that it thereby became *B. americana* (Hook.) Fern.

After a survey of a considerable array of North American *Braya* it is clear to the writer that these two Newfoundland species

with their lance-subulate siliques are distinctly unlike those collected from elsewhere on the continent. Any close relationship to Hooker's plants collected by Drummond "among the Rocky Mountains, between lat. 52° and 57°" seems unlikely. Even if, as Professor Fernald has suggested (*loc. cit.*), Stewardson Brown's no. 1457 of the Rocky Mountains should turn out to be conspecific with Drummond's material, it is certainly not conspecific with the plant of Newfoundland which has passed as *B. americana* (Hook.) Fern. Stewardson Brown's no. 1457, as contrasted with *B. Fernaldii*, has half-mature fruits which are narrowly ovate-elliptic rather than lance-subulate, the petals are wider and have purplish claws rather than being uniformly "pinkish" (Fernald, *loc. cit.*), the anthers are shorter and relatively broader, and the arms of the bifurcate hairs are longer than in the Newfoundland material.

B. Fernaldii and *B. Longii* share a combination of characters,—siliques lance-subulate, not torulose, 4–6 mm. long, the few seeds crowded usually into a single row—which sets them sharply off from all other North American species of *Braya*. However, the markedly larger petals (4–5 mm. long) with white limb and blue-violet claw, and the glabrous siliques of *B. Longii* distinguish it from *B. Fernaldii* with its smaller (3–4 mm. long) uniformly pinkish (to white) petals, and hirtellous siliques.

Because the name *B. americana* (Hook.) Fern. appears to be inapplicable, and because there is no other name available for this Newfoundland endemic, the writer considers it a privilege to name it for Professor M. L. Fernald, who critically described it. It is fitting, too, that his name and that of Bayard Long, should be linked in the names of these twin-species from the Newfoundland flora to the knowledge of which they together have added so much.

EXPLANATION OF PLATES 1088–1090

PLATE 1088. *BRAYA HUMILIS* (Mey.) Robins., habit-photographs of geographical races (see also Plate 1089, fig. 1), all $\times \frac{2}{5}$. FIG. 1, Race 5, Willoughby Cliffs, Vt., June 22, 1884, *C. E. Faxon* (G); FIG. 2, Race 6, Severn River, Hudson Bay, *J. M. Macoun*, no. 2087 (O); FIG. 3, Race 2, Itivdleq-Fjord, Qingua, Groenl. Occid., July 6, 1926, *M. P. Porsild* (G); FIG. 4, Race 3, Rivière Jupiter, Anticosti Island, *Marie-Victorin & Rolland-Germain*, no. 24,849 (O); FIG. 5, Race 4, Table Mountain, region of Port à Port Bay, Newfoundland, *Fernald & St. John*, no. 10,837 (G).

PLATE 1089. *BRAYA HUMILIS* (Mey.) Robins., habit-photographs of geographical races, ctd. (see also Plate 1088, figs. 1–5), $\times \frac{2}{5}$. FIG. 1, Race 1, Kempe Fjord, East Greenland, *Seidenfaden* 462 (B).